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Stated Meeting, March 15.

Present, twenty-five members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

The Statutes at Large of South Carolina, edited, under authority of the Legislature, by Thomas Cooper, M.D. LL. D. Vols. III. & IV. Columbia, 1838.—*From Dr. Tidyman.*

Laws of Maryland at large, with proper Indexes. To which is prefixed the Charter, with an English translation. By Thomas Bacon. Annapolis, 1765.—*From Mr. M. Carey.*

Laws of Maryland, made and passed at a Session of Assembly, in the year of our Lord, 1783. Annapolis.—*From the same.*

Congressional Documents for 1826. Two volumes. Washington, 1826.—*From the same.*

Discourse delivered before the Law Academy of Philadelphia, at the opening of the Session, September 5, 1838. By P. M'Call, Esq. Philadelphia, 1838.—*From the Author.*

On the relative strength and other mechanical properties of Cast Iron, obtained by hot and cold blast. By Eaton Hodgkinson, Esq. London, 1838.—*From the Author.*

On the strength and other properties of Cast Iron obtained from the hot and cold blast. By W. Fairbairn, Esq. London, 1838.—*From the Author.*

Address of the General Secretaries at the Eighth Meeting of the British Association for the advancement of Science. 1838.—*From Professor A. D. Bache.*

Catalogue of the Philosophical Instruments, Models of Inventions, Products of National Industry, &c. &c., contained in the first exhibition of the British Association for the Advancement of Science. Newcastle upon Tyne, 1838.—*From the same.*

Catalogue of the Officers and Students of the Medical Institute of the city of Louisville. 1839.—*From Dr. C. W. Short.*

Report of the Legislature of Pennsylvania, containing a description of the Swatara Mining District, illustrated by diagrams. Harrisburg, 1839.—*From Mr. F. Fraley.*

Report of the Superintendent of Common Schools, accompanied with Bills relating to the Common School System. Harrisburg, 1839.—*From Mr. Joseph C. Fisher.*

Reports relative to the Geological Survey of the State of New-York, for 1837. Albany.—*From Mr. Seabury Brewster.*

Transactions of the Maryland Academy of Science and Literature. Vol. I. Part I. Baltimore, 1837.—*From the Academy.*

Anales de Ciencias Naturales. Vols. I, II, III, IV, V, & VI. Madrid, 1799 to 1803.—*From Mr. John Vaughan.*

Descripcion de las Plantas que D. Antonio Josef Cavanilles demostrò en las Lecciones Públicas del Año 1801, precedida de los principios elementales de la Botánica. Madrid, 1802.—*From the same.*

Curso elemental de Botánica, dispuesto para la enseñanza del real Jardin de Madrid, por el Dr. Don Casimiro Gomez de Ortega. Madrid, 1795.—*From the same.*

Voyage de l'Ambassade de la Compagnie des Indes Orientales Hollandaises, vers l'Empereur de la Chine, dans les années 1794 et 1795. Vols. I, & II. Philadelphia, 1798.—*From the same.*

Memoirs comprising the navigation to and from China, by the China Sea and through the various Straits and Channels in the Indian Archipelago; also the navigation of Bombay Harbour. London, 1805.—*From the same.*

A journal of Natural Philosophy, Chemistry, and the Arts. By William Nicholson. Vols I, II, & III. London, 1797 to 1800.—*From the same.*

Calculations relating to the Equipment, Displacement, etc. of Ships and Vessels of War. By John Edye. London, 1832.—*From Mr. William Strickland.*

Professor Henry, of Princeton, made a verbal communication relating to a phenomenon of capillary action which had fallen under his notice.

A lead tube, of about half an inch in diameter, and eight inches long, happened to be left with one end immersed in a cup of mercury; and on inspection a few days afterwards it was observed that the mercury had disappeared from the cup, and was found on the floor at the other end of the tube. Struck with the phenomenon, the cup was again filled with mercury: the next morning the same effect was exhibited. The mercury had again passed over through the

tube, apparently like water through a capillary siphon, and was again found on the floor.

On cutting the tube into pieces, it was evident that the mercury had not passed along the hollow axis, but had, apparently, been transmitted through the pores of the solid metal. To determine this, a lead rod of about seven inches long and a quarter of an inch in diameter, was bent into the form of a siphon. The shorter leg was immersed in a watch-glass filled with mercury, and a similar glass placed under the end of the longer leg, to receive the metal which might pass over. At the end of twenty-four hours, a globule of mercury was perceived at the lower end; and in the course of five or six days, all the mercury passed over, leaving a crop of beautiful arborescent crystals, of an amalgam of lead, in the upper glass.

The mercury did not pass along the surface of the wire, since the lead exhibited, externally, but little change of appearance; although the progress of the penetration could be traced by a slight variation of the colour of the oxide on the surface.

The action is much influenced by the texture of the lead. When a rod of cast lead, of the same size and form, was substituted for the one before described, the globule of mercury did not make its appearance at the lower end until about forty days; and all the mercury of the upper glass had not yet (after three months) entirely disappeared.

The penetration takes place much more readily in the direction of the laminæ of the metal than across them A plate of thick sheet lead was formed into a cup, and mercury poured into this; and it was found that before a drop had passed directly through, the mercury oozed out all around the edge of the plate.

Professor Henry stated that he had in progress a variety of experiments to investigate this action; and if any results of importance were obtained he would communicate them to the Society.

Dr. Hare made a verbal communication to the Society, by which it appears that he has obtained brilliant metallic spangles of calcium.

His processes have been the deflagration of the phosphuret of calcium in an atmosphere of hydrogen; the exposure of the anhydrous iodide of calcium to a current of hydrogen,* or ammonia in an incan-

* By a deflagrator of one hundred pairs of plates, fourteen inches long by eight broad.

descent tube; the ignition of the pure earth or its carbonate or nitrate with sugar; or of the tartrate and acetate per se. Hence resulted carburets, which, after washing with acetic acid and rubbing on a porcelain tile, display the lustre of plumbago, intermingled with metallic spangles, of a brilliancy rivalling that of the perfect metals. The carburets, or the spangles thus obtained, are insoluble in acetic or chlorohydric acid, but yield to aqua regia. The carburets are excellent conductors of the voltaic fluid, as evolved by a series of 100 pairs; and, by deflagration in a receiver filled with hydrogen, yield metallic particles, which, rubbed on a porcelain tile, form spangles of a metallic brilliancy. By igniting antimony with tartrate of lime, Dr. Hare had procured an alloy of that metal with calcium, and expected by analogous means to alloy the metals of the earths with various metals proper. He believed that no effort to obtain calcium prior to his, had been more successful than the abortive experiment of Sir H. Davy, in which the tube broke before the distillation of the mercury was completed, with which the calcium had been amalgamated in the voltaic circuit, agreeably to the process previously employed by Berzelius. Dr. Hare had produced amalgams by exposing the chloride, or sulphide of calcium to the circuit; and, by distillation in an iron alembic, under the protection of a current of desiccated hydrogen, had isolated a portion of calcium, not however endowed with the whiteness or the lustre of that metal, as when otherwise fairly evolved. When distilled in glass tubes or retorts, he had found the amalgam to leave only a film upon the glass, devoid of any metallic attribute; although in one instance, to secure the absence of oxygen, he had mixed an amalgam of ammonium with that of calcium. Hence he inferred, that even though the tube of Davy had remained unbroken, that distinguished chemist would not have found a residue of calcium, uncombined with the elements of the glass. That the spangles obtained by Dr. Hare from lime, were calcium, was ascertained by their solution in aqua regia, and the successive subsequent addition of ammonia and oxalic acid; the resulting precipitate being ignited, then redissolved and again precipitated as at first. No precipitate ensued from the addition of ammonia prior to that of the oxalic acid. Sulphydric acid produced a slight discoloration, but gave no precipitate. That the substances, resulting from the ignition of the carbonate with sugar, and washing with acetic acid, contained calcium in the metallic state, combined with carbon, was evident from their being insoluble in acetic or chlorohydric acid; from the deposi-

tion of carbon, and giving a precipitate of oxalate of lime on being subjected to aqua regia, ammonia, and oxalic acid; from their metallic brilliancy, when burnished, and from their being excellent conductors of the voltaic fluid. By the ignition of the carbonates of baryta and strontia severally with sugar, Dr. Hare had attained analogous results to those abovementioned in the case of the similar ignition of carbonate of lime.

The extreme avidity of calcium for iron was quite striking; since, when a crucible was inclosed in a clean iron case without a cover, the mass, swelling up so as to reach the iron, became slightly imbued with it. By intensely igniting the carburet of calcium, obtained from the carbonate and sugar, with an equal weight of dry tanno-gallate of iron, the whole of the aggregate became so magnetic that every particle was transferred from one vessel to another by means of a magnet. The mass was filled with minute metallic globules, which yielded only partially to chlorohydric acid, and which, when dissolved in aqua regia, gave, after adding ammonia and filtration, a precipitate with oxalic acid.

Dr. Hare was aware that it did not seem consistent that spangles of calcium, burnished upon porcelain, should retain their lustre; as, under other circumstances, and especially when amalgamated, that metal was found to oxidize as soon as exposed to the air. He had, however, through the kindness of Mr. Booth, a pupil of Wöhler, procured a specimen of magnesium evolved by that celebrated chemist. This specimen yielded, under the burnisher, spangles of a lustre as enduring as that observed by Dr. Hare in the case of calcium. It should be recollected that slight causes may affect the oxidability of substances, as has been lately seen in the case of the reaction of iron with nitric acid; and it is well known that silicon, boron, and some other substances have two distinct states, in one of which there is a greater susceptibility of combination with other bodies than in the other.